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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,798	01/29/2004	Neil G. Murray JR.	TRW(TE)6888	7228
7590 07/25/2005 TAROLLI, SUNDHEIM, COVELL, & TUMMINO L.L.P. 1111 LEADER BLDG. 526 SUPERIOR AVENUE CLEVELAND, OH 44114-1400			EXAMINER VERBITSKY, GAIL KAPLAN	
			ART UNIT 2859	PAPER NUMBER

DATE MAILED: 07/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/767,798

Applicant(s)

MURRAY ET AL.

Examiner

Gail Verbitsky

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413) .<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)               |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7, 9, 13-16, 18, 20 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Dostoomian et al. (U.S. 4359622) [hereinafter Dostoomian] in view of JP 63130272 [hereinafter JP] and Shepard (U.S. 6585146).

Dostoomian et al. (U.S. 4359622) discloses the device and method in the field of applicant's endeavor comprising welding together two materials in a localized spot by providing a heating energy (by spot welders), and monitoring the spot (pool) for quality by obtaining an IR energy (thermal data) from the pool. This would imply that the device has a means for obtaining the thermal data. The device comprises a controller which adjusting the heating energy (magnitude of the weld current) by obtaining an IR energy/temperature from the welding tips, while the IR energy provides a measure of the temperature (thermal data) of the weld (col. 3, lines 5-6). The controller has a differential circuit for generating an error signal and apply (feedback) it to the input of the spot welder (heater) throughout the course of the welding operation (heating) in response to the thermal data /temperature evaluation of the weld as compared to the standard thermal history stored in a memory.

Dostoomian does not explicitly teach to simultaneously heat and observe (obtaining a thermal image/ thermal data) of the weld.

JP 63130272 discloses a device/ method of observing a weld. JP teaches to form a pool 12 by an arc (electric heating). As shown in the drawings, the device would allow observing a weld zone 2 of the pool 12 simultaneously with heating/ forming the pool.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by Dostoomian, so as to simultaneously heating and obtaining an image, as taught by JP, so as to allow the operator to immediately analyze the image and take necessary actions almost simultaneously with heating the weld and thus, to avoid enhancing the defect in the weld by a possible overheating.

Dostoomian does not explicitly teach that the thermal data is a thermal image.

Shepard discloses in Fig. 1 a device/ method for monitoring quality of weld 106 being formed between first and second pieces (surfaces) 104 a and 104b of a material 104, the method comprising the steps of heating the material 104 and the weld 106 with a heating source 102, collecting an infrared radiation (infrared wavelengths) passing through the material on the second surface 104b, obtaining an image (plurality of images) by a camera 108, and analyzing the image by a computer 112. It is inherent, that the camera captures the weld/ weld pool image in its entirety (thermal image/ temperature of each portion of the weld pool).

For claims 4-5: it is inherent that, using an infrared camera and obtaining a thermal image, the device is capable to determine temperature of each portion of the weld reflecting in pixels. The temperature and corresponding time (histogram) is compared to a threshold histogram (col. 1, lines 37-56, col. 5, line 48 and col. 8, lines 10-15).

For claims 7 and 9: the invention can determine both the size (thus, inherently, width) of the weld and the quality (presence of cracks, voids, defects, discontinuities) of the

Art Unit: 2859

bond (col. 7, lines 1-2) and, inherently, compare them to the threshold by means of the histogram.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the IR thermal data means, disclosed by Dostoomian, so as to have a thermal image means, in order to enable the operator to obtain a thermal image of the weld, as taught by Shepard, so as to provide the operator with a visual thermal data which could allow to immediately see defects and lack of integrity of the weld, in order to take necessary actions.

With respect to claim 13: the use of the device for welding/ monitoring the particular material, i.e., plastic, as stated in claim 13, absent any criticality, is only considered to be the "optimum" material that a person having ordinary skill in the art at the time the invention was made using routine experimentation would have found obvious to provide for the device disclosed by Dostoomian, since it has been held to be a matter of obvious design choice and within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of the invention. In re Leshin, 125 USPQ 416.

The method steps will be met during the normal operation of the device stated above.

3. Claims 1 and 13 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over JP 63130272 [hereinafter JP] in view of Moores et al. (U.S. 4990741) [hereinafter Moores] and Chang et al. (U.S. 4792683) [hereinafter Chang].

JP 63130272 discloses a device/ method of observing/ monitoring a weld and such, a quality of the weld. JP teaches to form a pool 12 by an arc (electric heating). As

Art Unit: 2859

shown in the drawings, the device would allow observing a weld zone 2 of the pool 12 simultaneously with heating/ forming the pool.

JP does not explicitly teach that the pool is formed by abutting of two pieces, as stated in claim 1, and that the image is a thermal image, as stated in claim 1.

Moore discloses a device/ method in the field of applicant's endeavor, wherein two metallic components are joined together (abutting), providing a beam of sufficient energy (heating) to melt the first and second components and to form a pool of a molten material between the components.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to form a pool of the weld, by abutting two pieces together and heating them, as already suggested by Moore and very well known in the art.

Chang et al. (U.S. 4792683) discloses a device to testing/ monitoring a joint by heating it and simultaneously detecting an IR emitted by the joint, creating a machine-readable IR profile (thermal image) and comparing it with a machine readable standard so as to determine the joint integrity and to identify a defective joint.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the imaging device disclosed by JP, with the IR imaging device, as taught by Chang, so as to allow the operator not only to obtain an image, such as defects, lack of integrity of the weld, but also to control, if the weld temperature is within predetermined limits, by obtaining a thermal image of the weld. With respect to claim 13: the use of the device for welding/ monitoring the particular material, i.e., plastic, as stated in claim 13, absent any criticality, is only considered to

Art Unit: 2859

be the "optimum" material that a person having ordinary skill in the art at the time the invention was made using routine experimentation would have found obvious to provide for the device disclosed by JP, since it has been held to be a matter of obvious design choice and within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of the invention. In re Leshin, 125 USPQ 416.

The method steps will be met during the normal operation of the device stated above.

4. Claims 12 and 23 are finally rejected under 35 U.S.C. 103(a) as being unpatentable Dostoomian, JP, and Shepard, as applied to claims 1-5, 7, 9, 13-16, 18, 20 above, and further in view of Kearney (U.S. 4446354).

Dostoomian, JP and Shepard disclose the device/ method as stated above in paragraph 2.

They do not explicitly teach an alarm.

Kearney discloses a device in the field of applicant's endeavor. A radiation received from a weld 18 is sent (feedback) to a weld controller 30, which activates an alarm in response to determining that the difference between the received signal and the reference signal values exceeds a pre-selected (threshold) limit (does not meet an associated criterion). The alarm can interrupt the device.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device disclosed by Dostoomian, JP and Shepard, so as to have an alarm, as taught by Kearney, in order to enable the device to interrupt welding should a failure occurs.

Art Unit: 2859

The method steps will be met during the normal operation of the device stated above.

5. Claims 6, 8, 10-11, 17, 19, 21-22 are finally rejected under 35 U.S.C. 103(a) as being unpatentable over Dostoomian, JP and Shepard, as applied to claims 1-5, 7, 9, 13-16, 18, 20 above, and further in view of Traub et al. (U.S. 4214164) [hereinafter Traub].

Dostoomian, JP and Shepard disclose a device/ method as stated above in paragraph 2.

They do not explicitly teach the particular weld controller as claimed by applicant.

Traub teaches a device / method in the field of applicant's endeavor wherein, in an automatic mode, a thermal signal from a weld is compared to a signal recorded in memory (reference/ threshold), if the signal is higher or lower than the reference (does not meet an associated criterion), welding parameters are being adjusted by a (feedback) control circuitry (weld controller).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the controller of the device, disclosed by Dostoomian, JP and Shepard, so as to have a feedback weld controller, as taught by Traub, in order to enable the device not only to detect failure but also to implement corrective functions.

The method steps will be met during the normal operation of the device stated above.



Art Unit: 2859

6. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dostoomian, JP and Shepard as applied to claims 1-5, 7, 9, 13-16, 18, 20 above, and further in view of Ish-Shalom et al. (U.S. 6299346) [Ish-Shalom].

Dostoomian, JP and Shepard disclose the device and method as stated above in paragraph 2.

They do not teach the limitations of claim 24.

Ish-Shalom discloses a device wherein in order to obtaining a correct temperature (thermal data) of a test sample (wafer), an IR wavelengths from the heating lamps cut off (filtered).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by Dostoomian, JP and Shepard, so as to cut off the heating radiation from the final thermal data results, as taught by Ish-Shalom, in order to preserve the accuracy of the thermal data, as already suggested by Ish-Shalom.

The method steps will be met during the normal operation of the device stated above.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 2859

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

Takeda et al. (U.S. 6462299) discloses the device and method in the field of applicant's endeavor comprising pieces 1a and 1b abutting each other for forming a weld (pool) and heating them with an induction heating apparatus 9 while the temperature is raised to a predetermined (annealing) temperature. This would imply, that the heating and temperature measurements (thermal image) are done simultaneously.

Geler et al. (U.S. 5474225) discloses the device and method in the field of applicant's endeavor. Geler monitors a just completed weld.

Jones (U.S. 4224499) discloses the device and method in the field of applicant's endeavor comprising a copper and an aluminum pieces butt-welded. The process involving heating and melting (pool formation) their interface. Jones does not teach to take IR images simultaneously with heating.

Any inquiry concerning this communication should be directed to the Examiner Verbitsky who can be reached at (571) 272-2253 Monday through Friday 8:00 to 4:00 ET.

Application/Control Number: 10/767,798

Page 10

Art Unit: 2859

GKV

Gail Verbitsky

Primary Patent Examiner, TC 2800

A handwritten signature in cursive script, appearing to read "G. Verbitsky", written in black ink.

July 13, 2005